This key should allow you to understand why you choose the option you did (beyond just getting a question right or wrong). More instructions on how to use this key can be found here.

If you have a suggestion to make the keys better, please fill out the short survey here.

Note: This key is auto-generated and may contain issues and/or errors. The keys are reviewed after each exam to ensure grading is done accurately. If there are issues (like duplicate options), they are noted in the offline gradebook. The keys are a work-in-progress to give students as many resources to improve as possible.

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1. Solve the linear inequality below. Then, choose the constant and interval combination that describes the solution set.

$$-8 - 6x < \frac{-37x + 8}{7} \leq -8 - 9x$$

The solution is $(-12.80, -2.46]$, which is option C.

A. $(-\infty, a] \cup (b, \infty)$, where $a \in [-14.25, -9.75]$ and $b \in [-3.75, -2.25]$

$(-\infty, -12.80] \cup (-2.46, \infty)$, which corresponds to displaying the and-inequality as an or-inequality AND flipping the inequality.

B. $[a, b)$, where $a \in [-14.25, -11.25]$ and $b \in [-3.75, 0]$

$[-12.80, -2.46)$, which corresponds to flipping the inequality.

C. $(a, b]$, where $a \in [-17.25, -9]$ and $b \in [-6, 1.5]$

* $(-12.80, -2.46]$, which is the correct option.

D. $(-\infty, a) \cup [b, \infty)$, where $a \in [-13.5, -12]$ and $b \in [-5.25, -1.5]$

$(-\infty, -12.80) \cup [-2.46, \infty)$, which corresponds to displaying the and-inequality as an or-inequality.

E. None of the above.

General Comment: To solve, you will need to break up the compound inequality into two inequalities. Be sure to keep track of the inequality! It may be best to draw a number line and graph your solution.

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2. Using an interval or intervals, describe all the x-values within or including a distance of the given values.

No less than 4 units from the number -5.

The solution is $(-\infty, -9] \cup [-1, \infty)$, which is option C.

A. $[-9, -1]$

This describes the values no more than 4 from -5

B. $(-\infty, -9) \cup (-1, \infty)$

This describes the values more than 4 from -5

C. $(-\infty, -9] \cup [-1, \infty)$

This describes the values no less than 4 from -5

D. $(-9, -1)$

This describes the values less than 4 from -5

E. None of the above

You likely thought the values in the interval were not correct.

General Comment: When thinking about this language, it helps to draw a number line and try points.

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3. Using an interval or intervals, describe all the x-values within or including a distance of the given values.

$$\text{No more than 9 units from the number } -2.$$

The solution is $[-11, 7]$, which is option A.

A. $[-11, 7]$

This describes the values no more than 9 from -2

B. $(-11, 7)$

This describes the values less than 9 from -2

C. $(-\infty, -11] \cup [7, \infty)$

This describes the values no less than 9 from -2

D. $(-\infty, -11) \cup (7, \infty)$

This describes the values more than 9 from -2

E. None of the above

You likely thought the values in the interval were not correct.

General Comment: When thinking about this language, it helps to draw a number line and try points.

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4. Solve the linear inequality below. Then, choose the constant and interval combination that describes the solution set.

$$\frac{-4}{6} - \frac{8}{7}x \leq \frac{-3}{4}x + \frac{3}{2}$$

The solution is $[-5.515, \infty)$, which is option C.

A. $[a, \infty)$, where $a \in [0.75, 6]$

$[5.515, \infty)$, which corresponds to negating the endpoint of the solution.

B. $(-\infty, a]$, where $a \in [3.75, 8.25]$

$(-\infty, 5.515]$, which corresponds to switching the direction of the interval AND negating the endpoint. You likely did this if you did not flip the inequality when dividing by a negative as well as not moving values over to a side properly.

C. $[a, \infty)$, where $a \in [-6.75, -3]$

* $[-5.515, \infty)$, which is the correct option.

D. $(-\infty, a]$, where $a \in [-6, -3]$

$(-\infty, -5.515]$, which corresponds to switching the direction of the interval. You likely did this if you did not flip the inequality when dividing by a negative!

E. None of the above.

You may have chosen this if you thought the inequality did not match the ends of the intervals.

General Comment: Remember that less/greater than or equal to includes the endpoint, while less/greater do not. Also, remember that you need to flip the inequality when you multiply or divide by a negative.

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5. Solve the linear inequality below. Then, choose the constant and interval combination that describes the solution set.

$$-10x + 3 < 7x - 4$$

The solution is $(0.412, \infty)$, which is option C.

A. (a, ∞), where $a \in [-0.62, -0.02]$

$(-0.412, \infty)$, which corresponds to negating the endpoint of the solution.

B. $(-\infty, a)$, where $a \in [-0.5, 0.2]$

$(-\infty, -0.412)$, which corresponds to switching the direction of the interval AND negating the endpoint. You likely did this if you did not flip the inequality when dividing by a negative as well as not moving values over to a side properly.

C. (a, ∞), where $a \in [0.03, 1.55]$

* $(0.412, \infty)$, which is the correct option.

D. $(-\infty, a)$, where $a \in [0.2, 0.5]$

$(-\infty, 0.412)$, which corresponds to switching the direction of the interval. You likely did this if you did not flip the inequality when dividing by a negative!

E. None of the above.

You may have chosen this if you thought the inequality did not match the ends of the intervals.

General Comment: Remember that less/greater than or equal to includes the endpoint, while less/greater do not. Also, remember that you need to flip the inequality when you multiply or divide by a negative.

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6. Solve the linear inequality below. Then, choose the constant and interval combination that describes the solution set.

$$-3x - 7 < 3x - 6$$

The solution is $(-0.167, \infty)$, which is option D.

A. (a, ∞), where $a \in [-0.06, 0.59]$

$(0.167, \infty)$, which corresponds to negating the endpoint of the solution.

B. $(-\infty, a)$, where $a \in [-0.34, -0.13]$

$(-\infty, -0.167)$, which corresponds to switching the direction of the interval. You likely did this if you did not flip the inequality when dividing by a negative!

C. $(-\infty, a)$, where $a \in [0.05, 0.9]$

$(-\infty, 0.167)$, which corresponds to switching the direction of the interval AND negating the endpoint. You likely did this if you did not flip the inequality when dividing by a negative as well as not moving values over to a side properly.

D. (a, ∞), where $a \in [-0.93, -0.15]$

* $(-0.167, \infty)$, which is the correct option.

E. None of the above.

You may have chosen this if you thought the inequality did not match the ends of the intervals.

General Comment: Remember that less/greater than or equal to includes the endpoint, while less/greater do not. Also, remember that you need to flip the inequality when you multiply or divide by a negative.

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7. Solve the linear inequality below. Then, choose the constant and interval combination that describes the solution set.

$$9 - 3x > 6x \text{ or } 7 + 6x < 7x$$

The solution is $(-\infty, 1.0)$ or $(7.0, \infty)$, which is option C.

A. $(-\infty, a] \cup [b, \infty)$, where $a \in [-9, -4.5]$ and $b \in [-4.5, 3]$

Corresponds to including the endpoints AND negating.

B. $(-\infty, a) \cup (b, \infty)$, where $a \in [-8.25, -3]$ and $b \in [-2.25, 2.25]$

Corresponds to inverting the inequality and negating the solution.

C. $(-\infty, a) \cup (b, \infty)$, where $a \in [-2.25, 2.25]$ and $b \in [1.5, 13.5]$

* Correct option.

D. $(-\infty, a] \cup [b, \infty)$, where $a \in [-2.25, 7.5]$ and $b \in [6, 9]$

Corresponds to including the endpoints (when they should be excluded).

E. $(-\infty, \infty)$

Corresponds to the variable canceling, which does not happen in this instance.

General Comment: When multiplying or dividing by a negative, flip the sign.

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8. Solve the linear inequality below. Then, choose the constant and interval combination that describes the solution set.

$$\frac{10}{8} - \frac{10}{7}x < \frac{-4}{5}x - \frac{10}{9}$$

The solution is $(3.756, \infty)$, which is option B.

A. $(-\infty, a)$, where $a \in [-6.75, -0.75]$

$(-\infty, -3.756)$, which corresponds to switching the direction of the interval AND negating the endpoint. You likely did this if you did not flip the inequality when dividing by a negative as well as not moving values over to a side properly.

B. (a, ∞), where $a \in [0.75, 6.75]$

* $(3.756, \infty)$, which is the correct option.

C. (a, ∞), where $a \in [-8.25, -2.25]$

$(-3.756, \infty)$, which corresponds to negating the endpoint of the solution.

D. $(-\infty, a)$, where $a \in [3, 5.25]$

$(-\infty, 3.756)$, which corresponds to switching the direction of the interval. You likely did this if you did not flip the inequality when dividing by a negative!

E. None of the above.

You may have chosen this if you thought the inequality did not match the ends of the intervals.

General Comment: Remember that less/greater than or equal to includes the endpoint, while less/greater do not. Also, remember that you need to flip the inequality when you multiply or divide by a negative.

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9. Solve the linear inequality below. Then, choose the constant and interval combination that describes the solution set.

$$6 + 7x > 8x \text{ or } 8 + 3x < 4x$$

The solution is $(-\infty, 6.0)$ or $(8.0, \infty)$, which is option C.

A. $(-\infty, a] \cup [b, \infty)$, where $a \in [-12, -4.5]$ and $b \in [-8.25, -4.5]$

Corresponds to including the endpoints AND negating.

B. $(-\infty, a) \cup (b, \infty)$, where $a \in [-15.75, -6]$ and $b \in [-9, -4.5]$

Corresponds to inverting the inequality and negating the solution.

C. $(-\infty, a) \cup (b, \infty)$, where $a \in [2.25, 9.75]$ and $b \in [4.5, 11.25]$

* Correct option.

D. $(-\infty, a] \cup [b, \infty)$, where $a \in [2.25, 9]$ and $b \in [6.75, 15]$

Corresponds to including the endpoints (when they should be excluded).

E. $(-\infty, \infty)$

Corresponds to the variable canceling, which does not happen in this instance.

General Comment: When multiplying or dividing by a negative, flip the sign.

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10. Solve the linear inequality below. Then, choose the constant and interval combination that describes the solution set.

$$9 - 5x \leq \frac{21x - 8}{6} < 9 + 3x$$

The solution is None of the above., which is option E.

A. $(-\infty, a] \cup (b, \infty)$, where $a \in [-4.5, 0.07]$ and $b \in [-22.5, -17.25]$

$(-\infty, -1.22] \cup (-20.67, \infty)$, which corresponds to displaying the and-inequality as an or-inequality and getting negatives of the actual endpoints.

B. $(-\infty, a) \cup [b, \infty)$, where $a \in [-4.5, 0]$ and $b \in [-21, -19.5]$

$(-\infty, -1.22) \cup [-20.67, \infty)$, which corresponds to displaying the and-inequality as an or-inequality AND flipping the inequality AND getting negatives of the actual endpoints.

C. $[a, b)$, where $a \in [-4.5, 0.75]$ and $b \in [-23.25, -15]$

$[-1.22, -20.67)$, which is the correct interval but negatives of the actual endpoints.

D. $(a, b]$, where $a \in [-4.27, 0]$ and $b \in [-24, -15]$

$(-1.22, -20.67]$, which corresponds to flipping the inequality and getting negatives of the actual endpoints.

E. None of the above.

* This is correct as the answer should be $[1.22, 20.67)$.

General Comment: To solve, you will need to break up the compound inequality into two inequalities. Be sure to keep track of the inequality! It may be best to draw a number line and graph your solution.